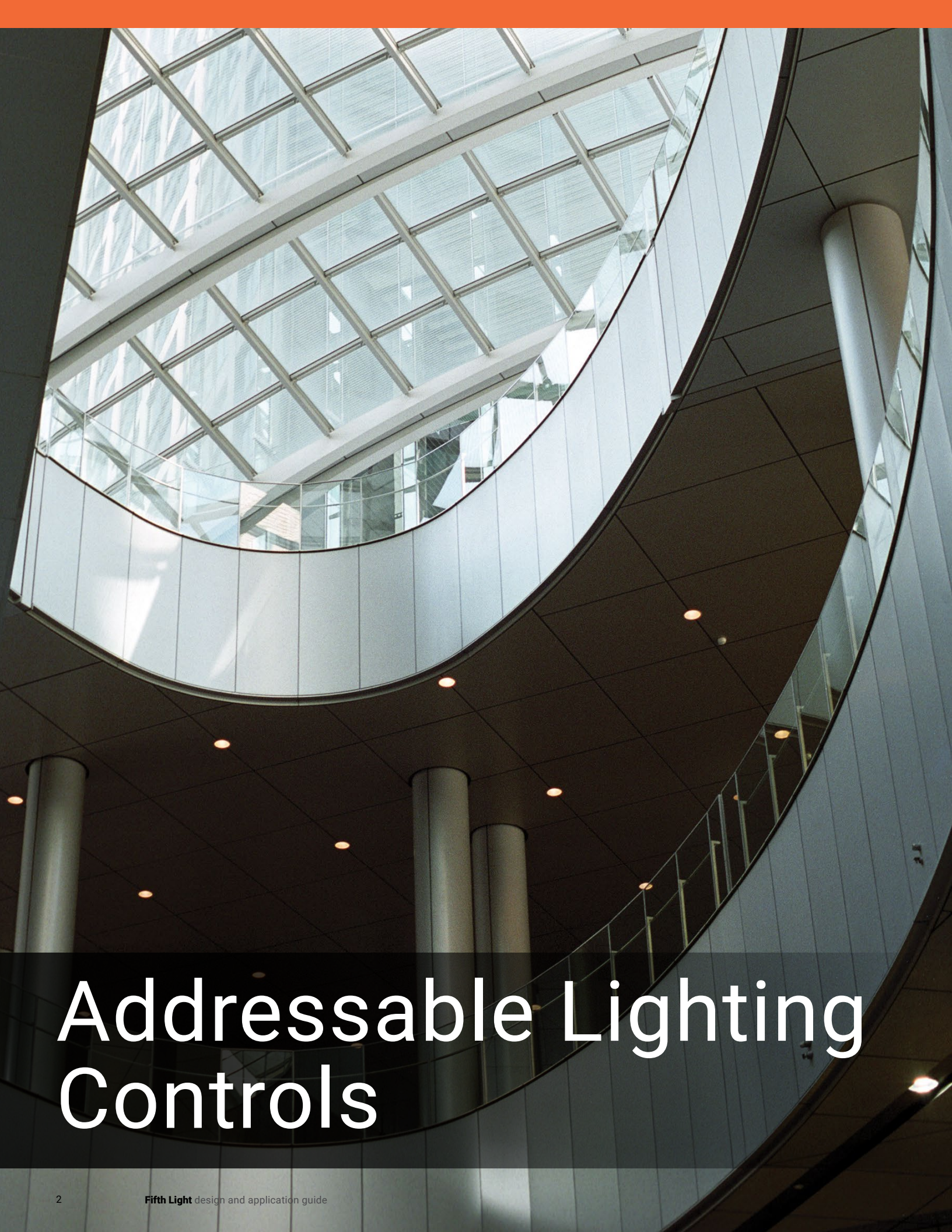




design and application guide







# Addressable Lighting Controls



# Table of contents

## Fifth Light

Introduction	4
What is the Fifth Light Solution?	5
Fifth Light Addressable Lighting Controls	5
What are the benefits?	5
Integrated control strategies	6
The Fifth Light System	7-9
Applications	10

## How to build a Fifth Light System

Define end devices	11
Define input devices	11
Count your devices	11
Defining the LCP	12-13
Defining the software integration	14

## Sample system

Sample system design	16-17
Sample system topology	18-19

## Lighting Management Software

Scalability	22-23
Flexibility	24-25
Accessibility	26-29
Analytics	30-31

## Frequently asked questions (FAQs)

32-33

# Introduction

**Lighting represents a major component of the total energy consumed by a building. Managing lighting with advanced technology is an effective way to control costs, increase efficiency and raise productivity.**

Our approach to lighting management is unique. We believe that the optimal lighting system is personalized. The internet architecture of our system allows the profiles of thousands of users, who can simultaneously control their areas from any internet device, to be factored into the daily operation of the lighting system. In addition, we incorporate a host of automated technologies to further reduce consumption.

When a system gives just the right amount of light, only when needed, the user, facility manager and environment all win.

**Conserve energy, reduce operating cost and improve lighting quality with the Fifth Light addressable lighting control system.**

- Ensure two-way communication and control with each lighting fixture of any load type, sensor or control device in the building
- Control a floor, building or campus of buildings from any web accessible device with up to 2500 simultaneous users
- Maximize building performance with control of every device, report and alarms of energy and maintenance data and direct integration with any building system



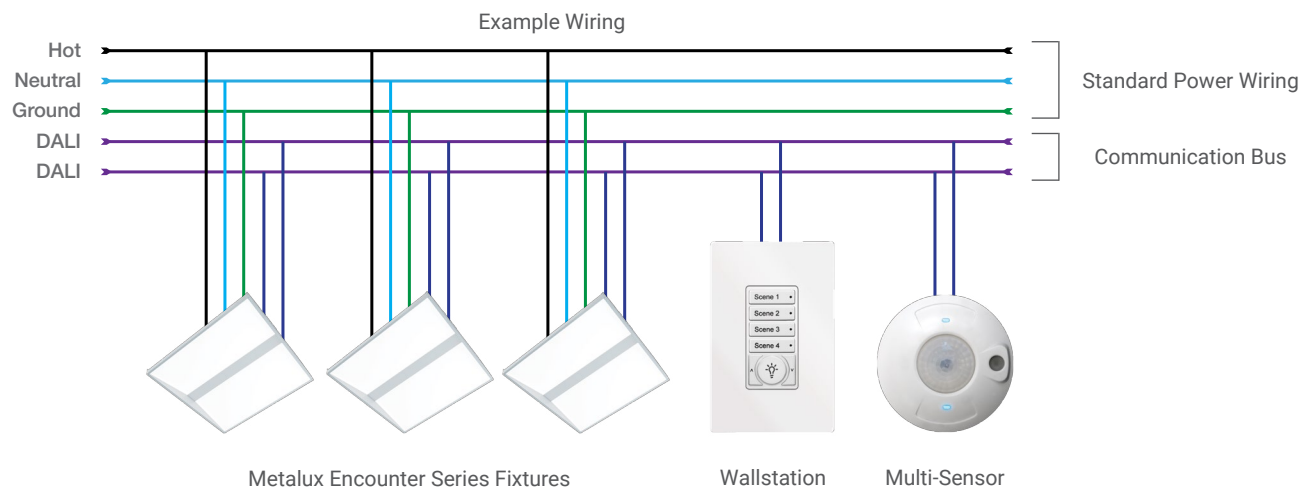


# What is the Fifth Light solution?

## Fifth Light Addressable Lighting Controls

The Fifth Light addressable lighting control system uses the DALI 2.0 protocol, which is an open protocol used for individual control of lighting ballasts, drivers and controls. The standard allows for multiple light fixtures to be connected together using a polarity free, low-voltage communication cable for On/Off and dimming controls. Up to 64 individually addressed devices can exist on a single DALI bus.

- Open protocol
- Topology and polarity free
- Simple to install Class 1 or Class 2 wiring
- Flexible control and administration



## What are the benefits?

- Energy Savings
- Flexibility
- Reduce Maintenance
- Visual Comfort

DALI provides the simplicity and flexibility needed to make the most of the lighting control system. The fact that DALI is an open protocol and an IEC standard provides the designer and owner the assurance of lighting fixture compatibility, long-term system support and many other benefits.

BENEFIT	HOW	LEED CREDITS
Maximum energy savings	<ul style="list-style-type: none"><li>• Ease of installation</li><li>• Daylight harvesting, occupancy sensing and other control strategies</li></ul>	IEQ credit 8.1 IEQ credit 8.2
Compatibility and flexibility	<ul style="list-style-type: none"><li>• Open protocol allows multiple manufacturers</li><li>• Addressable system helps solve complex lighting tasks</li></ul>	ID Credit 1 Up to 5 points
Ensure design integrity	<ul style="list-style-type: none"><li>• Helps deliver high energy efficient lighting controls</li></ul>	EA Credit 1 Up to 19 pts
Improves work environment	<ul style="list-style-type: none"><li>• Personal control</li><li>• Automatic adjustment to natural light</li></ul>	IEQ Credit 6.1

# Integrated control strategies

Fifth Light addressable lighting controls provide up to 70% verifiable lighting energy savings\* by incorporating the following strategies.



## Advanced Time Scheduling

Synchronizing the On/Off times of each fixture with the occupancy patterns of each building occupant eliminates wasted energy by ensuring that lights are only turned On when needed and shut Off when not in use.



## Occupancy Detection

The Occupancy Detection Module dims or turns Off lights through a software based profile that can be modified online and applied to any fixtures without rewiring.



## Dynamic Workpoints

Easily group fixtures that will be controlled together to provide occupants a quick way of triggering their lighting to a predefined level or to a level of their choosing.



## Daylighting Harvest

The autonomous operation of each light fixture from the next allows for complete adaptability to the ambient light level profile on a floor at any time of the day.



## Personal Control

Occupants can exercise control over personal lighting conditions through a web-based application that allows each occupant to tailor their lighting levels to suit the task at hand.



## Wall Mounted Control

Control individual or groups of fixtures and apply lighting scenes using wireless switches, keypads and touch screens. Apply virtual timer values to ensure lights return to default levels.



## Monitoring

The operating status of all system hardware and software is constantly checked by our Monitoring Utility.



## Zoning

The ability to configure lighting zones as tenants change is made possible by the virtual software groups. Lighting zones are created, modified and deleted through software and without any manual rewiring.



## UL 924 Control

Emergency lighting circuits allow for occupant safety and egress in the event of a failure of a facilities' primary power source as required by NFPA 101 Life Safety Code or other local building codes and standards.



## Receptacle Control

ASHRAE 90.1 promotes the idea of saving energy when rooms or buildings are not in use. The code states that at least 50% of all receptacles in private offices, open offices and computer classrooms must be automatically shut-off when unoccupied.



## Multi-Building Control

Manage an entire portfolio of buildings from a single access point through the web.



## Reporting

Building managers are given on-demand and monthly reports that accurately summarize the energy consumption of each tenant.



## Demand Response

Our flexible control topology allows facility managers to capitalize on financial incentive offered by utilities under their Demand Response programs using a priority based load shedding algorithm.

\*From case study October 2009



# Fifth Light system components

Addressable lighting controls consist of four main components: end devices, input devices, controllers and software. These components, each with a unique address, can be monitored and programmed without requiring special wiring.



## End devices (addressable units)

Up to 64 addressable ballasts, drivers, relays and dimmers on each DALI bus



### DALI dimming ballast

- 1% DALI ballast for T5 fluorescent load sources
- Simplify wiring by running DALI wires with line voltage
- Emergency automatic full bright during loss of DALI communications



### DALI LED drivers

- DALI LED driver for Cooper Lighting Solutions's lighting fixtures
- Provide design flexibility with open protocol LED drivers
- Emergency automatic full bright during loss of DALI communications



### DALI dimming module

- Dimming control for forward phase incandescent and magnetic low voltage loads
- Controls 20A dimming circuit
- Provides individual control of standard dimming circuits



### DALI digital to analog converter

- Simplified 0-10V luminaire control
- Provide UL 924 requirement when needed
- Supports flexible installation of any 0-10V fixture



### DALI field relay

- Relay switching for 20A, 120V - 347V On/Off loads
- Simple junction box installation
- Mount individually or in groups within the DALI Relay Panel



### DALI field relay (for plug load)

- Relay switching for 20A, 120V - 347V
- Field mountable or in groups within Relay Panel
- UL Listed for receptacle control



### Relay panel

- Permits control of standard On/Off luminaires from the integrated DALI communication interface
- Manual and programmable control of each relay via simple web-based software
- Capable of mixed loads as well as receptacle loads

# Fifth Light system components

## Input Devices (Controls)

DALI, wireless, low-voltage and LAN controls ensure design flexibility and end user comfort



### DALI multi-sensor

- Daylight and occupancy sensing
- Remote global adjustments of timing and controlled outputs
- Enhanced energy savings by dimming to Off immediately upon vacancy



### DALI wallstation

- Software programmable settings
- Create virtual groups for flexible configurations and controls
- Draws power from the DALI communications bus to simplify wiring



### Low-voltage switches

- On/Off/Dimming of any DALI zone or group
- Provides user control of lighting
- Allows user to control the lighting with intuitive wallstation



### Mobile software

- Mobile software permits the user to adjust lighting directly from a mobile device
- Apply lighting scenes for presentations, reading or to suite personal preferences
- Leverage existing company mobile devices for lighting control



### VOIP lighting software

- Software that supports multiple IP phone models on the existing building LAN
- Control your lighting on an individual or group basis from your IP desk phone
- Use existing IP phone capabilities to simplify user lighting control



### Touch screen

- IP touch screen for control of lighting or groups of lighting
- Adjust light levels and groups with raise, lower, On/Off and simple controls
- Avoid hard wired connections with IP control of lighting and groups



### Low-voltage sensors

- Increase energy savings with Greengate PIR, Ultrasonic and Dual Technology sensors
- Occupancy coverage for larger areas up to 2000 sq. ft.
- Connect directly to the Lighting Control Panel (LCP) or DALI Powerpack



### DALI powerpack

- Enables low-voltage sensors to connect to the DALI bus
- Allows up to five (5) low-voltage sensors to share unique DALI addresses
- Simplifies DALI addressing for low-voltage occupancy sensor with patent pending technologies



# Fifth Light system components

## Controllers

Control DALI buses and relay panels from centralized location



### Central server

- Enterprise system control
- Allows large scale integration and control
- Centralized site data storage and web-based controls



### Lighting control panel

- Controller for all DALI communications and software connections
- Create virtual groups for flexible configuration and control
- Connects to the building LAN for simplified scalability and accessibility

## Software and Integration

Web-based software, integration and services increase system flexibility



### Lighting Management Software

- Web-based software for control, programming and monitoring of the addressable lighting control system
- Permits management of the addressable system using graphic floorplan and scalable web-based adjustments
- Simplify maintenance and energy tracking with reporting and analytics



### BACnet integration

- Integrated BACnet® interface runs on the Lighting Management Server and requires no additional hardware
- Accepts alarms and emergency messages to override lighting
- Automatically maps lighting control points to BACnet points with no extra programming



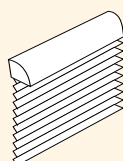
### Web services

- Machine to machine communications via HTTP protocol
- RESTful protocol simplifies installation
- Uses XML security features



### openADR

- Uses certified openADR VEN device
- Secure DR communications from Utility
- Customized DR lighting scenes



### Shade integration

- Integration with third party blinds
- Shade control through contact closure, ethernet, BACnet or Modbus
- Shade integration and coordination with lighting using Lighting Management Software

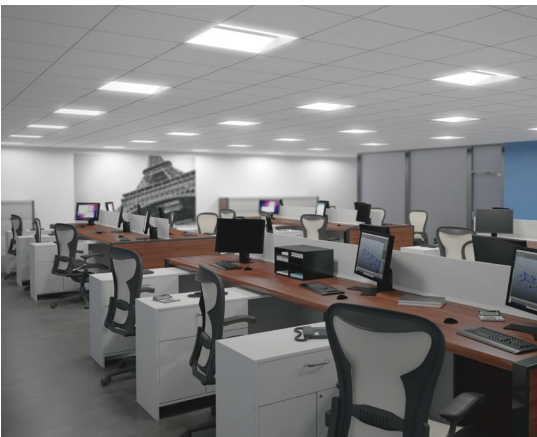
\*BACnet is a registered trademark of ASHRAE

# Applications



## Private office

A well designed office space requires an advanced energy efficient design and highly controllable lighting. With Fifth Light, the occupant is in control. The lighting can be turned On to specified levels based on occupancy in the space or manually from a wall mounted control or VOIP phone. Daylight sensors will adjust the lighting throughout the day keeping the employee in a comfortable work environment. When it is time to leave, the lighting and switched receptacles are automatically turned Off.



## Open office

Large work areas can be difficult to keep energy efficient while also satisfying the individual needs of each of the occupants. With Fifth Light, large open office areas can be controlled by time schedule or based on occupancy from either a manual wall switch or occupancy sensor. Personal control and addressable light fixtures allows each occupant to control the lighting over their section of the office. Each fixture can be software assigned to take advantage of the daylight sensors, making daylight harvesting simple.



## Conference room

Proper lighting that emphasizes daylighting with natural light provides a more focused meeting environment. With Fifth Light, scene control allows the lighting levels to be easily controlled via a wallstation or triggered automatically based on occupancy sensor. Scene adjustments can temporarily override the daylight sensor, allowing for proper lighting during meetings and presentations, while the occupancy sensor can ensure that the lighting and receptacles are turned Off when the room is vacant.



## Hallways / bathrooms / stairwells

Areas that are inconsistently used need to maximize energy savings while ensuring proper lighting when needed. With Fifth Light, centralized time based scheduling, along with occupancy detection, ensures that lighting is low or Off when the spaces are not occupied and return to a specified light level as the users enter the spaces. Incorporating Demand Response ensures that these areas are reduced first, providing a greater reduction in energy usage.





# How to build a Fifth Light system



## Step 1: Define end devices

Select the appropriate End Devices (see page 7) for the luminaires you wish to control.

- These can be specified as an individual component or part of a Powered by Fifth Light luminaire from Cooper Lighting Solutions

Note: Field Relays and Digital to Analog Converters (DAC's) count as 2 devices when you define your LCP. For plug load control specify the Field Relay.

## Step 2: Define input devices

Select the appropriate Input Devices (see page 8) to control your lighting.

- To ensure optimal performance, it is suggested that no more than 8 Multi-Sensors and 16 Wallstations per DALI bus

Note: Wallstations (DALI and low-voltage switches) count as 2 devices when you define your LCP.

## Step 3: Count your devices

The number of devices (see page 8) will determine the LCP size.

- Count the number of End Devices (ballasts, relays, plug load controls, etc.)
- Count the number of Input Devices (controls)

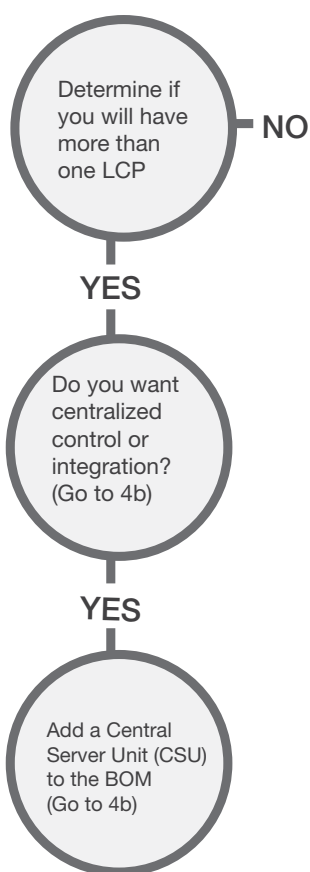
# Defining the LCP

The LCP is the central controller that houses the DALI bus controller as well as the zone controller server. Use the decision tree on the next page to configure the catalog number.

## Step 4a:

### Determine stand-alone or centralized control

- Complete steps 4b through 4e for each LCP
- If more than one LCP is used and Centralized Control is required, add a CSU to the Bill of Materials



## Step 4b:

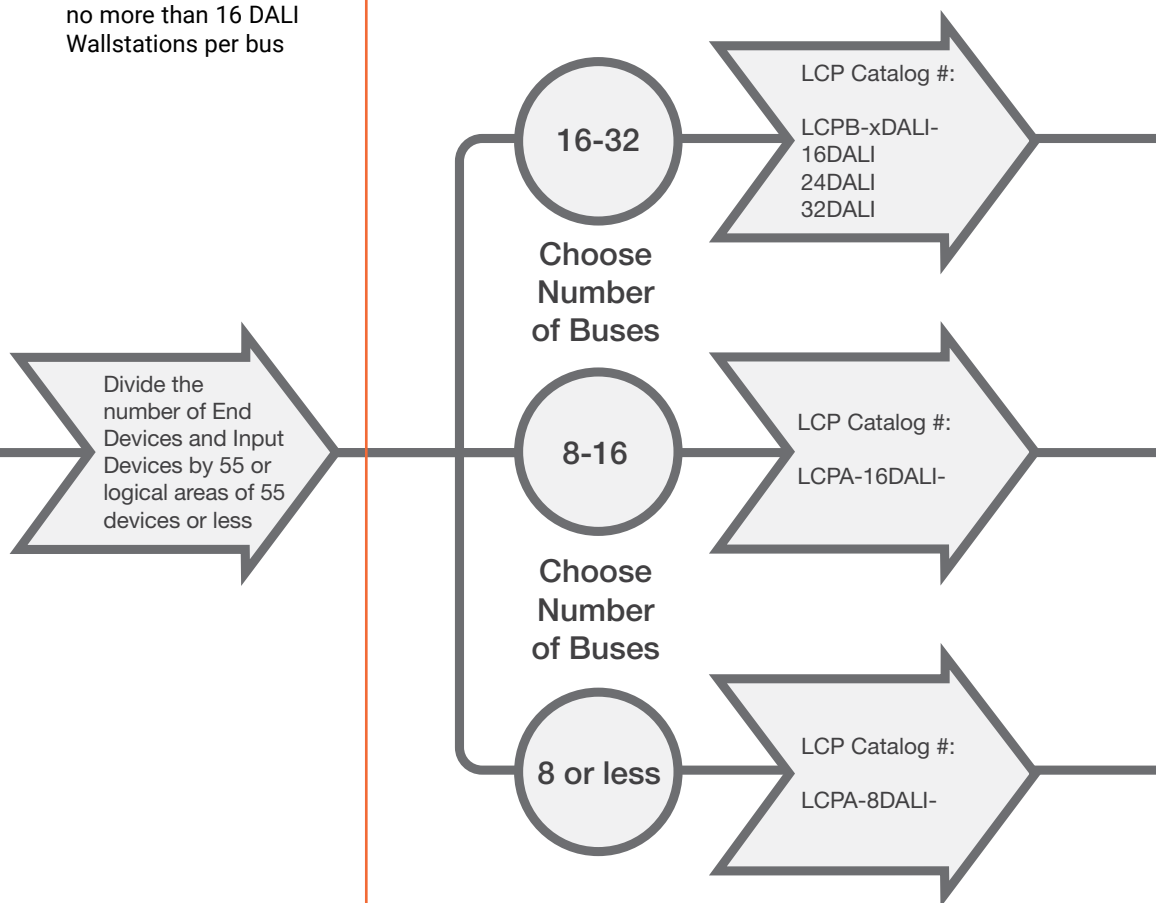
### Determine the number of DALI buses

- DALI buses support 64 device addresses; however, it is suggested to plan for 55 devices or load to 80%
- It is suggested to load no more than 8 Multi-Sensors per bus
- It is suggested to load no more than 16 DALI Wallstations per bus

## Step 4c:

### Define LCP size and number of DALI buses

- There are two LCP enclosure types
- LCPA can support up to 16 DALI buses (for small projects)
- LCPB supports up to 32 DALI buses



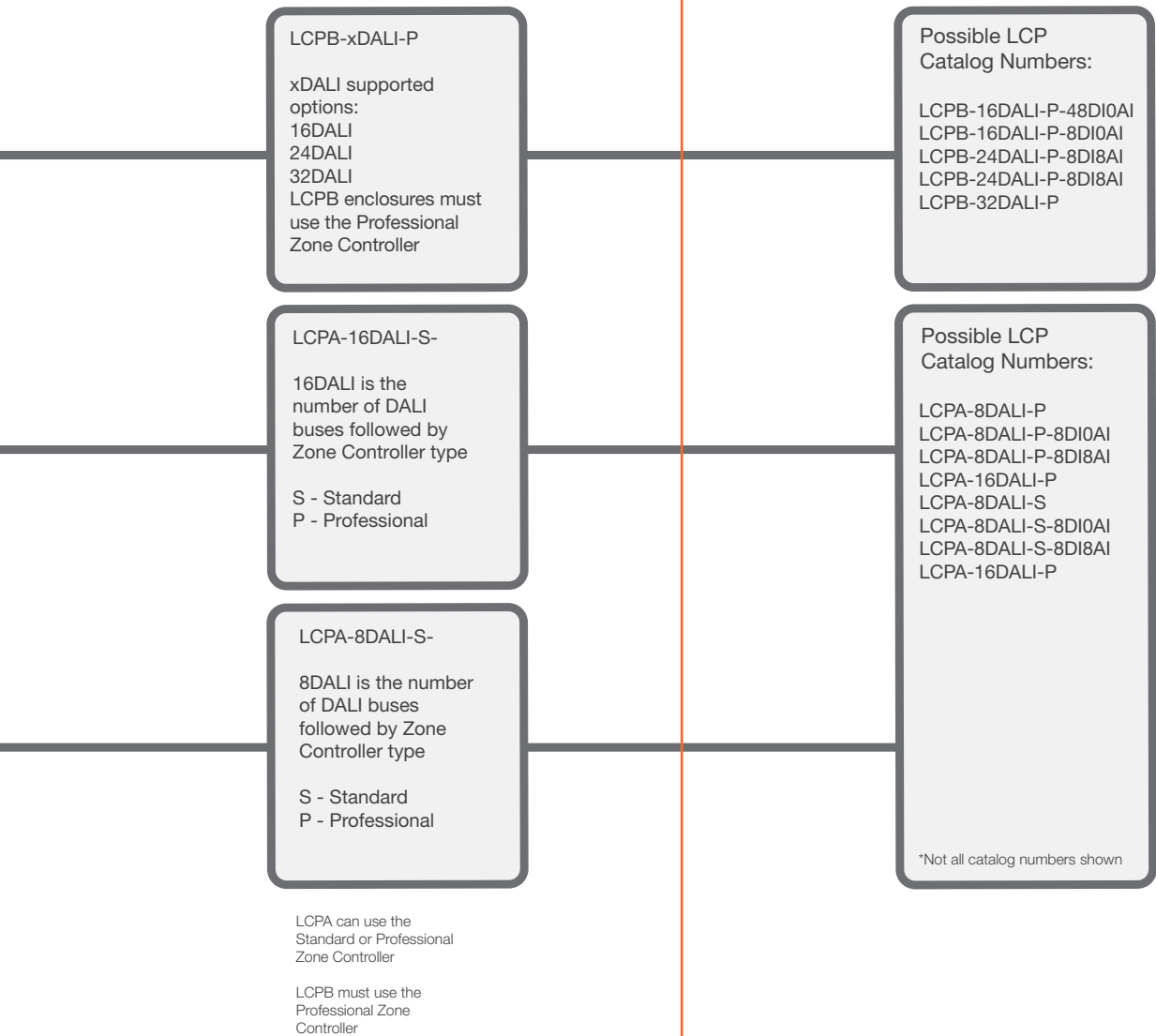
# Defining the LCP

Step 4d:  
Select zone controller

- Standard:**
  - LMS access only
  - Up to 16 buses
  - LCP is used with CSU
- Professional:**
  - LMS access only
  - Up to 16 buses
  - LCP is used with CSULMS
  - Up to 32 buses
  - 5 mobile users
  - 250 BACnet points
  - 25 VOIP phones

Step 4e:  
Choose digital/analog input options

- 8DI0AI (can be installed in LCPA with 8 DALI buses or LCPB w/ up to 24 buses)
- 8DI8AI (can be installed in LCPA with 8 DALI buses or LCPB w/ up to 24 buses)
- 48DI0AI (can be installed in a LCPB with up to 16 buses)
- 48DI8AI (can be installed in a LCPB with up to 16 buses)





# Defining the software integration

## Step 5:

### Define software integration - third party integration and other options drive additional energy savings

Select integration options from the table below.

The LCPA can use either the Standard or Professional Zone Controller; the LCPB must use the Professional Zone Controller.

- The Standard Zone Controller provides basic capabilities and web access of a single LCP
- The Professional Zone Controller and Central Server Unit permit the capabilities of various integration methods
- The Central Server Unit ties together multiple LCP's as well as permits more integration options
- Each integration method must be called out on the bill of materials using the appropriate catalog number

Light Control Panel and Zone Controller Feature List				
	Standard (zone controller)	Professional (zone controller)	Central Server Unit (CSU)	Integration Option catalog numbers
Controls 8-16 buses	X	X	X	Included with LCPA or LCPB
Controls 8-32 buses		X	X	Included with LCPB
Controls single LCP	X	X	X	Included
Controls multiple LCP's			X	Included with CSU
Access to LMS (software)	X	X	X	Requires FLT-LMS
Permits 5 Mobile Users		X	X	Requires FLT-iBuilding-iPhone
Permits 250 BACnet points		X	X	Requires FLT-BACnet
Permits 25 VOIP phones		X	X	Requires FLT-VOIP
Permits Alerts			X	Requires FLT-LMS
Permits Reporting		X	X	Requires FLT-LMS
Permits Shade Control			X	Requires FLT-SHADE
Permits multiple Mobile users			X	Requires FLT-iBuilding-iPhone
Permits full BACnet Integration			X	Requires FLT-BACnet
Permits full VOIP Integration			X	Requires FLT-VOIP
Permits XML Integration		X	X	Requires FLT-XML
Centralized Database			X	Included with CSU
Centralized Web Interface			X	Included with CSU

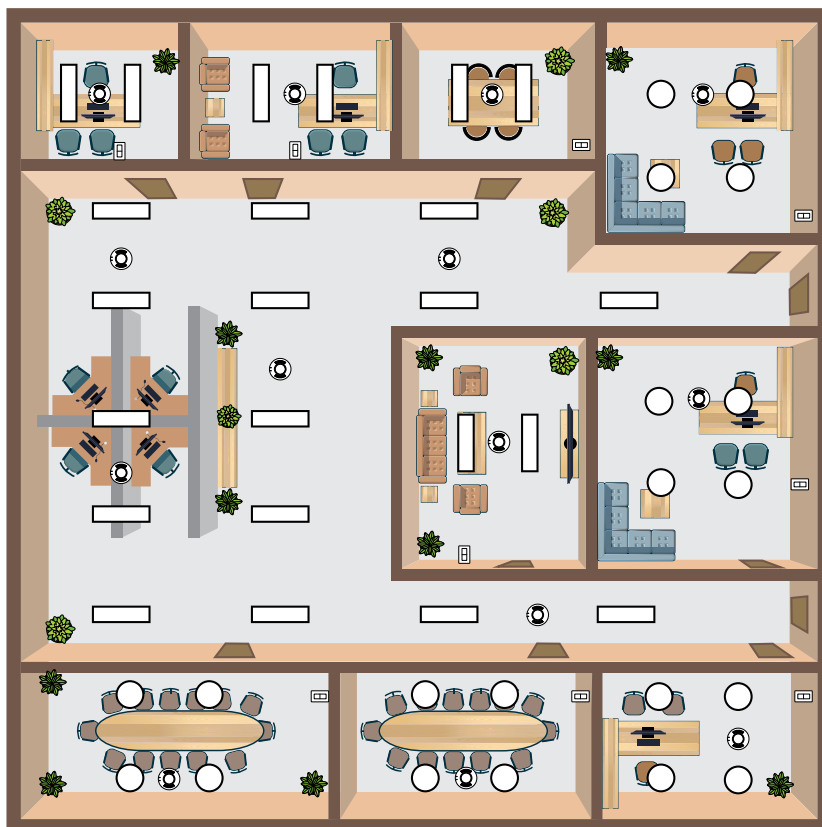


# Sample system design

The next two pages introduce you to a typical building and will guide you through the process of defining the addressable lighting control system.

The office space (below) includes multiple small offices, four larger offices, an open office area, two conference rooms and hallways.

Each space requires occupancy detection, the large offices with windows require daylighting and all enclosed spaces require manual control via a wallstation.



**This floor plan has 45 light fixtures 14 occupancy sensors and 9 wallstations.**

Although this would only require 2 DALI buses, we will group this into four logical areas (shown in the next image) to simplify wiring and control zones.

This sample bill of materials would start with:

## End Devices

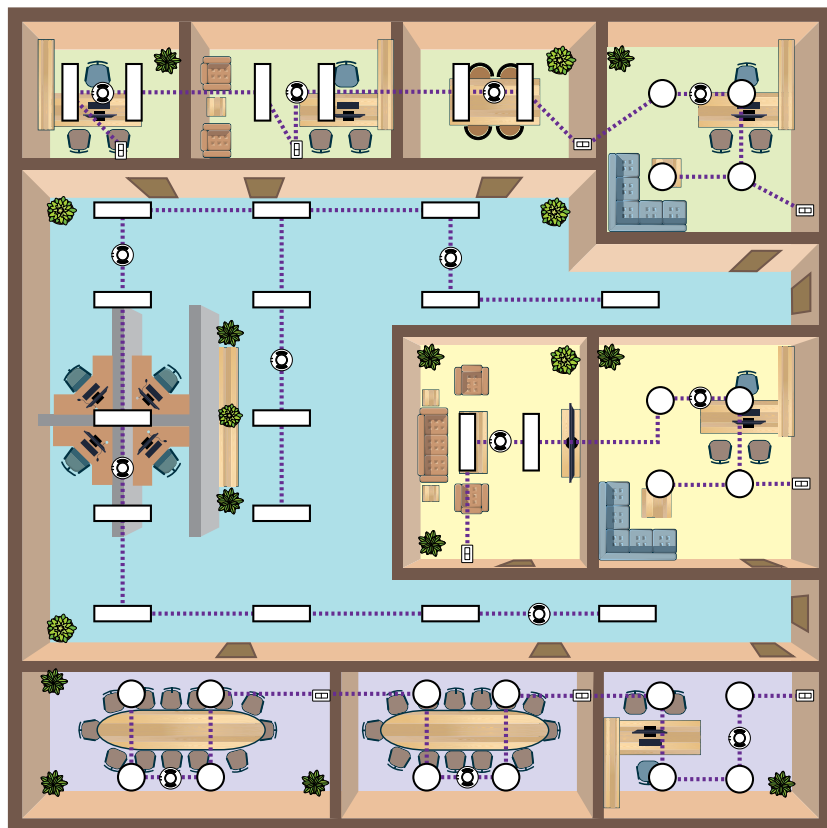
- Qty: 45 luminaires (manufacturers catalog number)

## Input Devices

- Qty: 3 OCS-D-P06 (Multi-Sensor for small private offices)
- Qty: 6 OCS-D-P12 (Multi-Sensor for large offices and conference rooms)
- Qty: 3 FLT-SP-MV-DC2 (DALI Powerpack)
- Qty: 5 OAC-DT-2000-R (Dual Tech 2000 sq. ft. sensor)
- Qty: 9 FDW-4TSB-RL-W (DALI Wallstation)

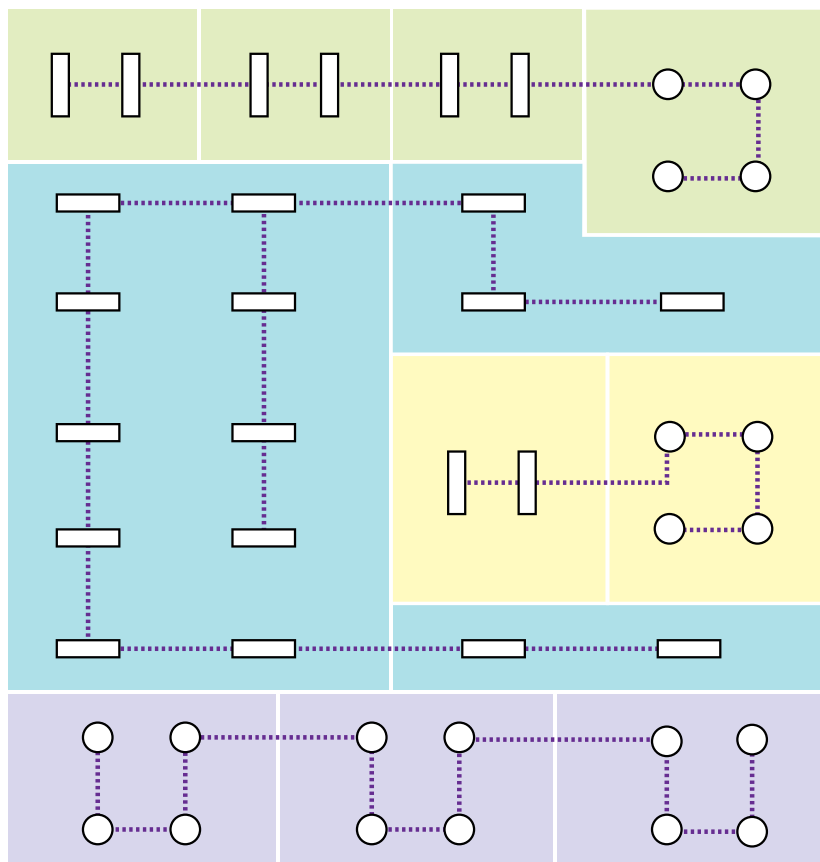
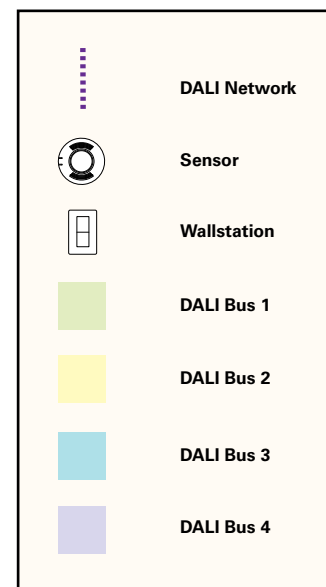


# Sample system design



## DALI buses

4 DALI buses (left) show the fixtures and controls connected.



## Zone control

Control zones are logical groups of fixtures that are controlled by occupancy sensors, daylight sensors, wallstations and time schedules.

This is a single floor space which requires occasional web control and may implement VOIP phones in the future.

The LCP on the sample bill of materials would be:

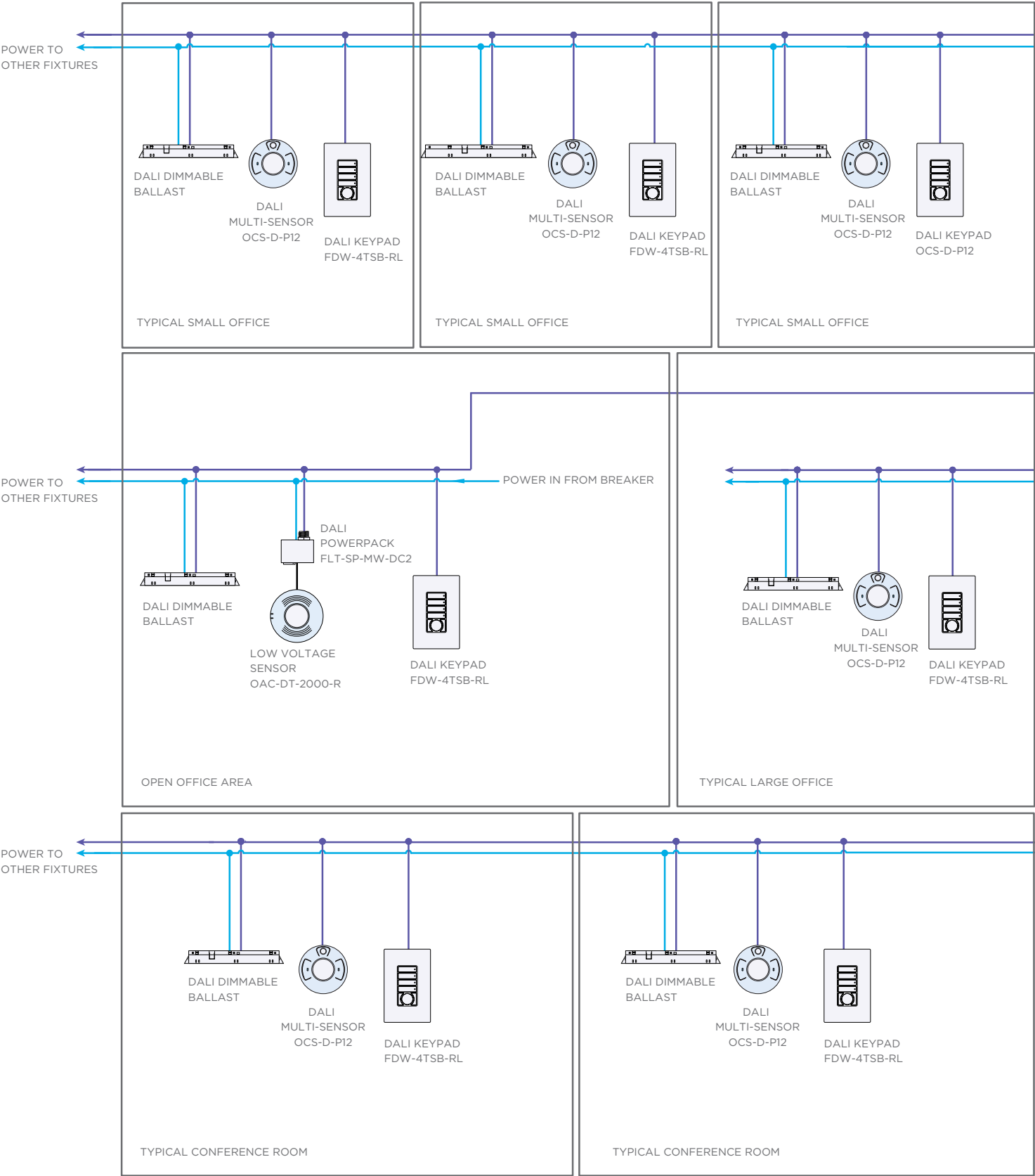
### Define the LCP

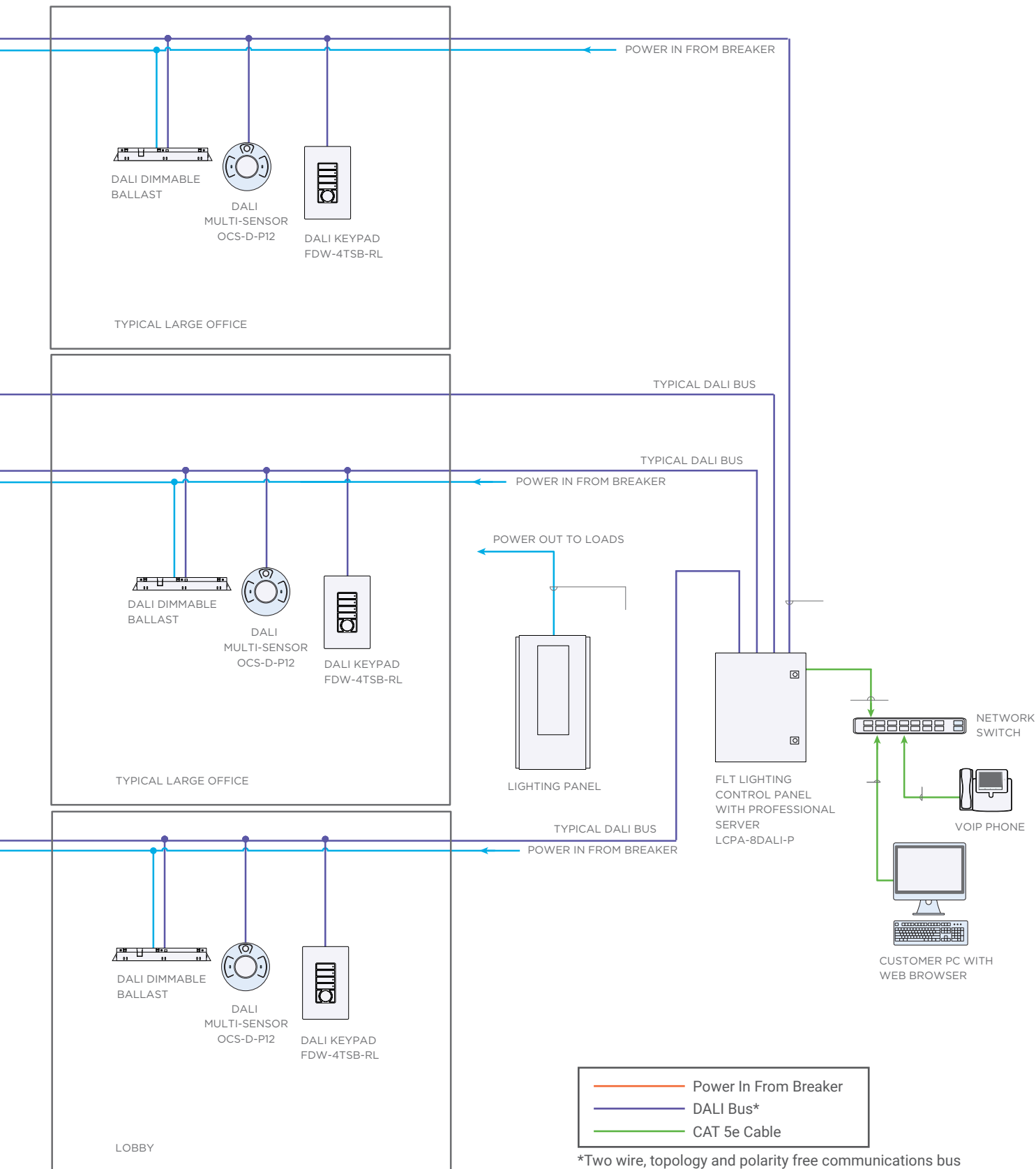
- Qty: 1 LCPA-8DALI-P

### Define Software and Integration

- Qty: 1 FLT-LMS

# Sample system topology





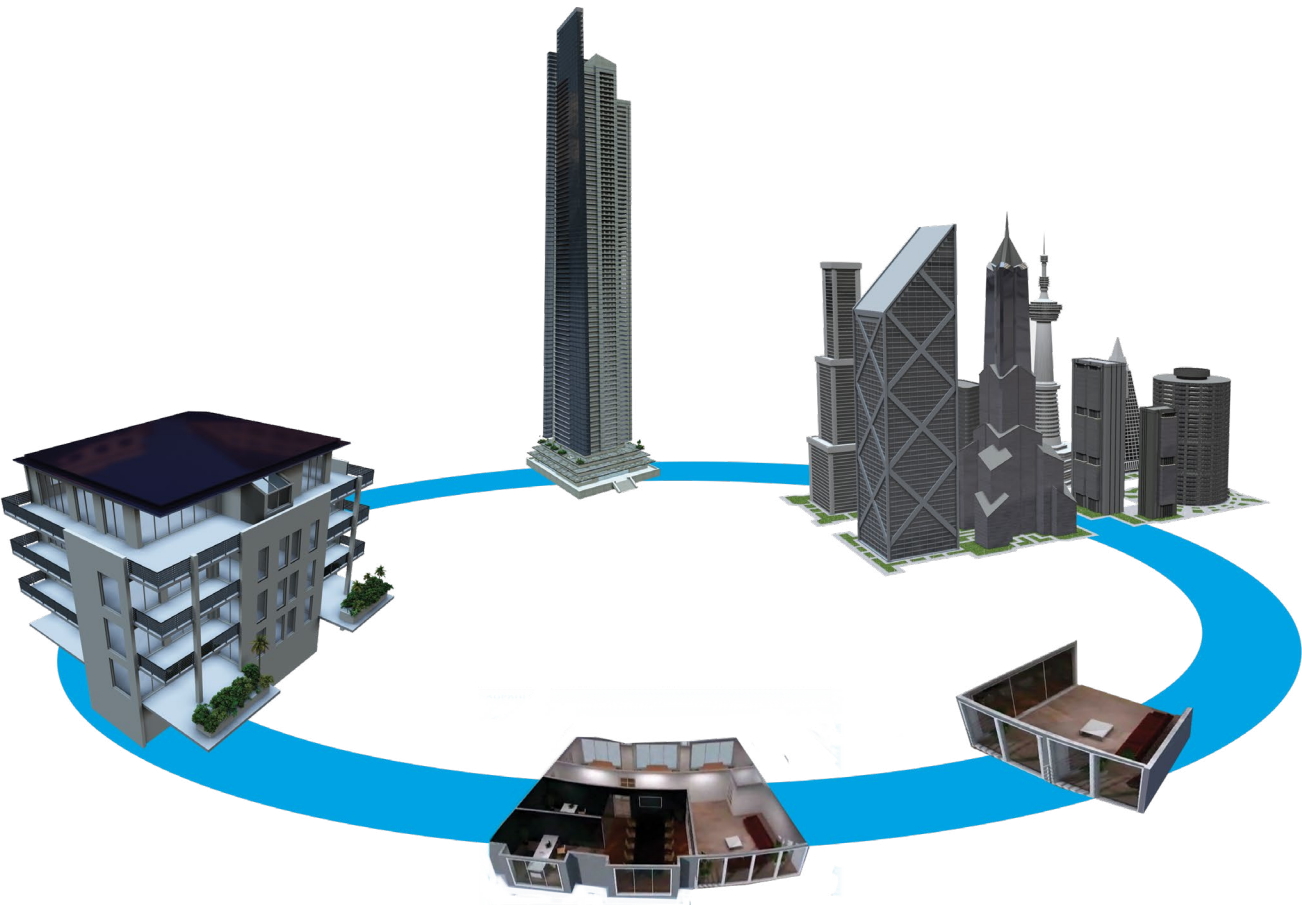


# Lighting Management Software

The Lighting Management Software (LMS) is integral to the LCP and Central Server Unit and is used to control, program and monitor the system.

The Lighting Management Software, a tool to manage the system components, along with Cooper Lighting Solutions’s Lighting fixtures, represents an unparalleled total lighting solution. This solution is scalable from small to large systems while offering web-based accessibility from a variety of IP and mobile devices and in-depth reporting and analytics. The lighting solution should provide benefits to everyone included in the design or use of the system. End users, facility managers and specifying engineers each obtain specific benefits from the addressable lighting control solution and Lighting Management Software.

USER BENEFITS of Addressable Lighting Control Systems		
Benefits to the Specifying Engineer	Benefits to the Facility Manager	Benefits to the End User
Maximum LEED points with flexible controls, daylighting and analytics	Modular design and flexibility provides improved space utilization and control	Control of work space lighting increases occupant satisfaction
DALI open protocol for LED, fluorescents, 0-10V and incandescent lighting provides unmatched single system design flexibility	Global control and programming makes managing and adjusting space control easy	Web-based and mobile tools allow you to control your lighting from virtually anywhere
Single source for lighting, controls and software to provide a scalable design that is easy to use	Alerts and lamp life information reduce maintenance time	









# Scalability

## Scalable solution from single fixture to multi-building.

The DALI communication bus connects light fixtures and control devices together, allowing for expand ability from a single room to an entire multi-building network.

- Lighting Management Software allows control of single fixture or large network
- Control single ballast or multiple Lighting Control Panels over the building LAN
- Simple profiles and building hierarchy provides scalable control of the entire system

**Personal Control**

Overrides Scenes

Units

Units	Light Level	Remaining (HH:MM)
<input checked="" type="checkbox"/> 1001	-	-
<input checked="" type="checkbox"/> 1002	-	-
<input checked="" type="checkbox"/> 1003	-	-
<input checked="" type="checkbox"/> 1004	-	-
<input type="checkbox"/> 1005	-	-
<input type="checkbox"/> 1006	-	-
<input type="checkbox"/> 1007	-	-
<input type="checkbox"/> 1008	-	-
<input type="checkbox"/> 1009	-	-

1 / 13

Set Override

Light Level

70%

☐ High Priority

☐ Duration (hh:mm)

☒ End Time

☐ Until Further Notice

10 : 00

Send

Adjust light levels from 0% to 100% in increments of 1%. Select a duration so that lights automatically return to normal levels. The maximum allowable duration is a dynamic parameter that changes based on the time of day.

### Benefits

- Individual fixture adjustments
- Scalable network control
- Web-based user interface



# How scalable would you like your system?

## Adjust site settings for the entire building or a single fixture.

Reconfigure all settings and operating parameters from Lighting Management Software (LMS); never need to adjust anything manually. Apply settings to specific devices or to a floor or building or multi-building network.

- Global adjustments and control using intelligent profiles for occupancy sensors, groups, wallstations and daylight sensors
- Global sensor control provides improved building energy control
- Intelligent ballast parameters, like maximum or minimum levels, are easily adjusted for a single fixture or large group

**1** Store profiles in the database and apply them to multiple occupancy sensors in one step.

**2** Enable and disable occupancy sensors during certain times of the day to avoid unwanted switches.

**3** Assign the sensor to fixtures that are connected to different DALI communication buses.

**4** Program 5 sequence levels to smoothly transition from the occupied to the vacant levels.

**Control DALI fixtures, 0-10V, relays and forward phase dimmers from a single front end.**

### Benefits

- Global adjustments
- Flexible control mapping
- Centralized parameter adjustments

# Flexibility

**Reduce operating costs, improve lighting quality and collect an attractive return on investment with flexible schedules and controls.**

- Simplify schedule maintenance with global adjustments
- Flexible profiles can be applied to a single fixture or the entire building
- Guarantee energy savings with schedules that bring lighting On to a less than 100% light level

The screenshot displays the Fifth Light scheduling software interface. At the top, there's a navigation bar with icons for various functions and a 'Signed as: Justin Foreword' status. The main area is divided into three sections: a left sidebar for 'Schedules' and 'Profiles', a central 'Week of December 8 to December 14' calendar view, and a right 'Floor Map' showing a grid of light fixtures. Below the main interface, three numbered callouts (1, 2, 3) highlight specific features:

- 1** **Repeats**: A dropdown menu set to 'None'. Below it, 'Start Time' is set to 4:00 pm and 'End Time' to 12:00 am. A 'Light Level' slider is positioned at 80%. Buttons for 'Apply' and 'Cancel' are at the bottom.
- 2** **Repeats**: A dropdown menu set to 'every week'. Below it, checkboxes for days of the week (Mon, Tues, Wed, Thurs, Fri, Sat, Sun) are shown. 'Starts on' is set to Aug 12 2010 and 'Ends on or by' is set to Aug 12 2010. Buttons for 'Apply' and 'Cancel' are at the bottom.
- 3** **Units**: A list of units with a table showing their schedule. The table has columns for 'Units' and 'Schedule'. The units listed are 1001, 1002, and 1003, all with a schedule of 90/90. Buttons for 'Cancel' and 'Apply' are at the bottom.

Each callout box has a black footer with white text:

- Callout 1: Program light level transitions on a per minute basis.
- Callout 2: Set a recurrence pattern and save the schedules to apply it at a later date.
- Callout 3: Assign a schedule to multiple devices in one step.

## Benefits

- Global scheduling
- Profile control
- Guaranteed energy savings

# How flexible do you need your lighting controls?

Easily modify the way your lighting is controlled as you modify your building and work spaces.

- Control different light sources on different communication buses easily with virtual daylight groups
- Easily create and modify multi-zone daylight zones with gradient dimming from window to interior lighting
- Simply adjust controlled outputs as your space utilization changes

The screenshot displays the Fifth Light software interface for Daylight Harvesting. The interface includes a top navigation bar with icons for various functions. The main content area is divided into several sections:

- Profiles:** A list of profiles (Profile One to Profile Six) with a table showing Light Level (%) and Setpoint values.
- Minimum Light Level:** A slider set to 80%.
- Scaling Factor:** A numeric input field set to 2.00.
- Scheduling:** Options for None, All Days, and Weekdays, with a table for Active and Inactive hours.
- Floor Plan Diagram:** A diagram showing a room layout with six numbered zones (1-6) representing different lighting areas.

Three callout boxes provide additional information:

- 1:** Program the operating profile of each sensor online and make modifications through software to avoid manual adjustments.
- 2:** Set up gradients so the same sensor dims lights closer to window more than those further away from it.
- 3:** Assign the sensor to fixtures that are connected to different DALI communication buses.

## Benefits

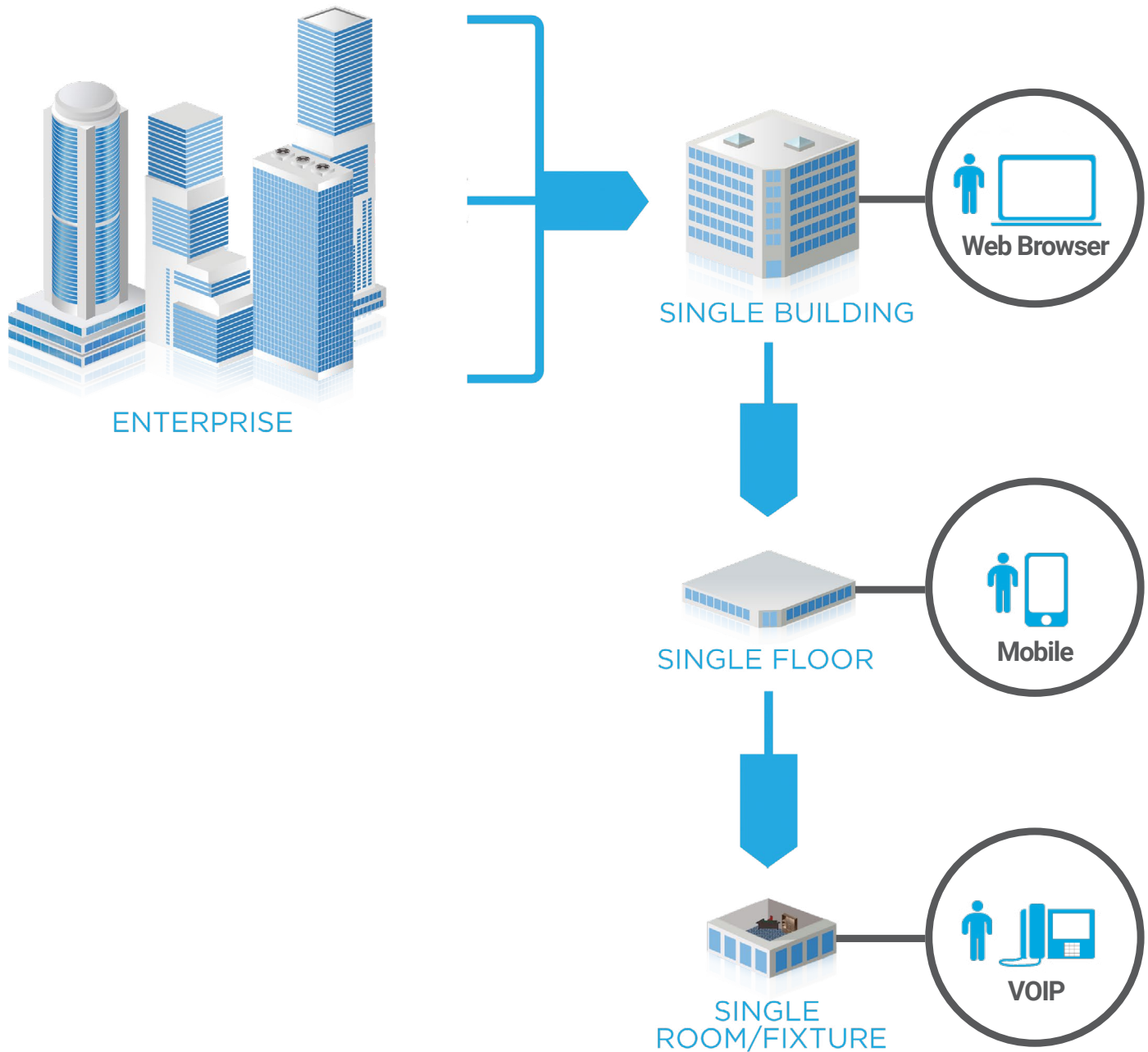
- Virtual daylight groups
- Remote software adjustments
- Space utilization changes



# Accessibility

**Turn your internet device into a lighting control and management apparatus -  
Ultimate convenience for higher efficiency.**

- Distribute operation of the lighting system to different user types to increase energy conservation and take advantage of personalized lighting levels
- Eliminate single platform limitations with the LMS multi-platform support of web browsers, mobile phones, IP devices and VOIP phones
- Allow users to control a single fixture to the entire building from anywhere



**Varying degrees of user access permits programming of devices, groups and time schedules remotely.**

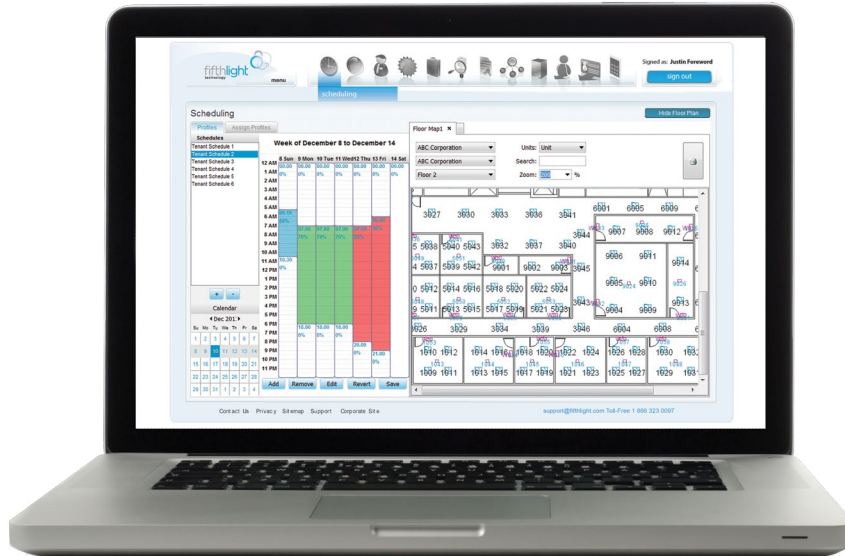
- 
- The screenshot displays the 'fifthlight technology' user setup interface. At the top, a navigation bar includes a 'menu' button and a 'user setup' button. The main window is titled 'User Setup' and features a sidebar with tabs for 'Profiles', 'Roles', 'Units', 'Peripherals', 'Workpoints', and 'Phones'. The 'Profiles' tab is active, showing a list of users: 'John Josephs', 'Justin Smith', and 'Roger Jones'. The 'John Josephs' profile is selected, and its details are shown in the main area. These details include a 'Prefix' dropdown set to 'None', 'First Name' as 'John', 'Middle Name(Optional)' as an empty field, 'Last Name' as 'Josephs', 'UserName' as 'John Josephs', a 'Password' field with a 'Change...' button, 'User Type' as 'General User', 'Tenant' as 'Default', and 'E-mail(optional)' as 'jjosephs@abccompany.com'. To the right of the profile details is a 'Units' list with a tree view showing a hierarchy of building components: 'Clients', 'Portfolios', 'Complexes', 'Buildings', 'Floors', 'Tenants', 'Users', 'Workpoints', and 'Units'. The 'Units' item is selected, and a list of unit numbers (1001, 1002, 1003, 1004, 1005) is displayed below it. A 'Provide access to select areas of the building' message is shown at the bottom of the units list. On the left side of the main window, a 'Roles' list is visible, showing a grid of roles for 'User: John Smith'. The roles include 'Add Hardware', 'Building Setup', 'Commissioning', 'Monitoring Results', 'Management', 'Overriding', 'Report Review', 'Scene Control', 'Scheduling', 'System Setup', 'Tenant Setup', and 'User Setup'. The 'Monitoring Results' and 'System Setup' roles are selected. A 'Cancel' button is located at the bottom of the roles list. The interface is signed in as 'Justin Foreword' in the top right corner. The support email 'support@fifthlight.com' and toll-free number '1 866 323 0097' are displayed at the bottom right.

- Adjustable user access rights
- Graphical space visualization
- Tenant privileges

# Accessibility

## Multi-platform support allows control of lighting from VOIP, mobile device and any web browser.

The Lighting Management Software (LMS) is multi-platform: web, mobile, VOIP, digital signage and wallstations. The LMS supports Internet Explorer, Apple Safari, Google Chrome, Mozilla Firefox and supports all Cisco phones equipped with XML.



## Web client removes the need to install software or maintain multiple licenses.

- Each web browser is a personal control access point
- Raise/lower or adjust scenes for personal comfort
- Use specific screens, simplify control

## Digital signage keeps users informed of energy usage and drives behavior change.

- Provide energy savings data
- Reinforce efficiency behaviors with positive data
- Communicate to building users the energy conservation benefits





# When would you like to access the system?



## Control DALI fixtures, 0-10V relays and incandescent dimmers from a single front end.

Native iOS application allows users to adjust lighting levels on a group or individual fixture basis based on user access rights.

- Full range dimming from mobile device
- Mobile devices became space controllers for presentations, meetings and conferences
- Set lights to user preferred levels with mobile represents and scenes

## VOIP phone services from CISCO allow the user to launch the lighting control application.

- VOIP desk phone becomes office user personal control
- Numeric keypad or touchscreen provides simple lighting control
- Presentation, meeting or conference lighting scenes conveniently controlled from VOIP phone



## Touch Screen provides simple and intuitive control of DALI fixtures and scenes.

- Ethernet interface shares data on existing Local Area Networks
- Publish custom graphics that speak to your business needs
- Touch screen allows interface to be customized and updated remotely

# Analytics

## Eliminate the guesswork of when you need to replace a lamp or ballast with automatic alerts.

Reporting is critical to proper maintenance and support of the building lighting control system. Reduce maintenance time with automatic operating status and life cycle reporting.

- Notify service personnel of lamp life and status with alerts
- Clearly indicate location of aged devices with the LMS integral floor plans
- Eliminate wasted time of service personnel looking for failed lamps with the LMS reporting screens

The screenshot displays the Fifth Light monitoring interface. At the top, there's a navigation bar with icons for various functions and a 'Signed as: Justin Foreword' status. The main area is divided into sections for 'Monitoring', 'Units', 'Devices', and 'Profiles'. A 'Floor Map 1' is shown, displaying a grid of units with their status (Pass, Fail, Unreachable) and light level. A table on the left lists units with their ballast status, lamp status, and light level. A 'Profile Name' field is set to 'Floor 1 Lamps and Ballasts'. A 'To:' field is set to 'Tony@CompanyABC'. A 'Subject:' field is set to 'RE: Daily Lighting Status Report (July 25, 2009)'. An 'Alert Every:' dropdown is set to '4hr'. A 'View lamp and ballast status report' button is visible.

**Units Table:**

Units	Ballast Status	Lamp Status	Light Level
1010	Pass	Pass	100%
1011	Pass	Pass	100%
1012	Pass	Pass	100%
1013	Pass	Pass	76%
1014	Pass	Pass	76%
1015	Pass	Pass	76%
1016	Pass	Pass	76%
1017	Pass	Pass	70%
1018	Unreachable	N/A	N/A

**Profile Name:** Floor 1 Lamps and Ballasts

**To:** Tony@CompanyABC

**Subject:** RE: Daily Lighting Status Report (July 25, 2009)

**Alert Every:** 4hr

**View lamp and ballast status report.**

## Benefits

- System alerts
- Graphical indication of alert
- Reduce maintenance time

# What would you like to learn about your building?

## Environmental tracking publishes site environmental impact and savings to web or large TV.

Environmental equivalency factors are tracked in real-time using software calculations and are calibrated based on geographic location.

- Track building metrics defined by sustainability manager
- Environmental tracking values configured for building geographic location
- Sustainability and environmental information viewable from web browser, centralized TV and digital signage



### Benefits

- Sustainability metrics
- Environmental tracking
- Digital signage displays



# Fifth Light FAQs

## Why has the lighting industry adopted addressable systems?

Addressable systems have been found to save up to 75% in excess of standard time based or occupancy based controls wide used to meet minimum standards of the electrical code. Addressable systems provide additional granularity of control to ensure all spaces, and even lighting fixtures, can be optimized around energy savings and visual performance by combining occupancy sensing, daylight harvesting, time based control, personal controls, load shed, task turning and demand response functions through the facility. In addition, unlike standard centralized or distributed control systems using 0-10V, addressable systems allow the owner to modify the space to meet the ever changing needs of the occupants. Many hard wired solutions are simply disabled when the space requirements change.

## What is the cost difference between DALI ballasts and drivers and standard drivers?

From a electrical component standpoint DALI is very similar to 0-10V requirements. Cooper Lighting Solutions offers 0-10V or DALI ballasts for as little as a \$29 adder over rapid start fluorescent ballasts in standard fixtures. With respect to LED, within 2014 many drivers will come available with 0-10V and/or DALI options standard on the same product. Contact your local sales agent for pricing and availability for DALI enabled fixtures, or ballasts and drivers.

## Are addressable systems more difficult to manage for facility teams?

No - Addressable lighting systems are far simpler to manage than the other addressable systems in a commercial building including the HVAC system.

## How is a DALI based lighting control system wired?

DALI wiring is the simplest control wiring available today. DALI can use standard THNN wire, the same wire type electrical contractors use for power wire, and can be wired class 1 or class 2, either in conduit with the power wire, or outside conduit similar to 0-10V wire. In addition, DALI wiring is topology and polarity free and is essentially the same wiring as dual level switching wiring. In many cases, the electrical code has been modified to require uniform light level reduction and two switches in hopes that contractors and specifiers will gravitate towards addressable systems.

## What are the advantages of using THNN wiring versus CAT5e wiring for addressable systems?

There are many reasons not to use CAT 5 between lighting fixtures.

**Cost** - When an electrical contractor calculates labor on a project, they factor low-voltage wiring and high voltage wiring with similar labor hours, meaning power and control would be calculated as two infrastructures, but the material costs are different. With respect to material, CAT 5 costs roughly \$0.20 - \$0.30 per foot and needs to be terminated. Each termination is calculated at 6 minutes, meaning 12 minutes a cable adding installation cost. With a DALI solution (since 5 conductor wire can be used for power and communication) it is calculated as 1 infrastructure. The material cost adder to add two additional conductors to the power wires is far less than the addition of the low-voltage CAT 5 network labor and installation. The DALI architecture does not require additional or custom terminations, the contractors use the same tools they use for power.

**Addition of 3rd network** – Most CAT 5 based solutions use this for data and then use 0-10V to communicate to the driver or ballast itself. This means the contractor may actually be laboring power wire, low-voltage control wires to ballasts and drivers and then a CAT 5 network between devices. This is 2-3 times the terminations and 2 additional infrastructures over a DALI based architecture.

**Quality** – CAT 5 was designed and optimized for communication cabling in IT networks, not for applications in lighting fixtures. Over time, additional heat from luminaires will deteriorate the CAT 5 cable connections creating challenges, whereas DALI networks are nestled within conduit.

**Safety** – Where pendant lighting fixtures are used, CAT 5 solutions require multiple drops or Class 2 only CAT 5 to be run within fixtures in the ballast channel with only a 1/4" separation from the line voltage power wire.

# Fifth Light FAQs

## Do wireless sensors reduce the overall cost of a lighting control system?

Wireless devices are appealing in pure retrofit applications where ceilings are inaccessible. In new construction or retrofit applications where ceilings are easily accessible, the single largest driver of installation cost is the number of devices, not necessarily how they are wired. For example, a standard occupancy sensor is labored for 90 minutes during estimation. This time includes overhead for locating the product, securing the area and required equipment, as well as clean up time. The actual time spent wiring is only a few minutes of this time. When a contractor labors a wireless sensor, much of the overhead time (finding the device, securing the area and required equipment, as well as clean up) are all included, minimizing the savings. Therefore, if more wireless sensors and gateways are required, it can be higher cost.

## Does Fifth Light work with all DALI ballasts?

Yes - Most manufacturers of DALI ballast adhere to the IEC standard 60929, which ensures interchangeability and interoperability of ballasts and drivers from various manufacturers. This includes Cooper Lighting Solutions's Lighting fixtures, which include DALI ballasts and drivers, as well as third party ballasts and drivers, as long as they adhere to the IEC standard.

## Can a user supplied server be provided?

Yes - In specific cases there are user requirements that necessitate the need for a user supplied server. The Fifth Light Lighting Management Software (LMS) can be installed on a Virtual Machine that can be installed on the user supplied server.

## How does the Fifth Light system affect the network traffic?

The network traffic generated by the Fifth Light system is negligible. IP based traffic occurs between the Central Server and individual Lighting Control Panels. Typically, the total data transfer between the Central Server and one Lighting Control Panel for an area with 1000 End Devices, and 200 DALI Multi-Sensors and DALI Wallstations would be less than 10 MB per day. This includes real time back up of data on the Lighting Control Panels and web browser traffic. DALI based traffic occurs between individual Lighting Control Panels and the DALI devices only.

## Can it support UL 924 requirements?

Yes - The DAC-DC1 / DAC-DC2 end device is UL 924 listed and automatically closes upon loss of the DALI bus. The Greengate CEPC products can also be used to force loads to the full on position in the event of a normal power loss.

## Can the Fifth Light System control plug loads?

Yes - the Field Relay has been tested and is UL Listed for control of plug loads.

## Does the Fifth Light System support 3rd party integration?

Yes - The Fifth Light system supports many 3rd party integration methods and protocols. This is done by using either the Professional Zone Controller or Central Server Unit. Integration options include:

- HVAC (BACnet)
- AV (XML)
- Security (XML)
- Shade (XML or Day Contact)

## Fifth Light





**Lighting Brands**

Ametrix  
AtLite  
Corelite  
Ephesus  
Fail-Safe  
HALO  
HALO Commercial  
Invue  
iO  
Iris  
Lumark  
Lumière  
McGraw-Edison  
Metalux  
MWS  
Neo-Ray  
Portfolio  
PrentaLux - 3D Printed Lighting  
RSA  
Shaper  
Streetworks  
Sure-Lites  
Telensa

**Controls Brands**

Greengate  
Fifth Light  
Intelligent Lighting Controls

**Connected Lighting Systems  
and Smart Spaces Platform**

WaveLinx



**Cooper Lighting Solutions**  
1121 Highway 74 South  
Peachtree City, GA 30269  
P: 770-486-4800  
[www.cooperlighting.com](http://www.cooperlighting.com)

Canada Sales  
5925 McLaughlin Road  
Mississauga, Ontario L5R 1B8  
P: 905-501-3000  
F: 905-501-3172

© 2023 Cooper Lighting Solutions  
All Rights Reserved  
Printed in USA  
Publication No. BR503051EN  
February 2023

Cooper Lighting Solutions is a  
registered trademark.

All other trademarks are property  
of their respective owners.

Product availability, specifications,  
and compliances are subject to  
change without notice.